

From Seeds to Shoreline
Engaging Students in Salt Marsh Restoration
Water Education Summit, Chattanooga, TN
September 24-26, 2013



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Goal: *Students will understand the importance of the salt marsh ecosystem through involvement in a student-action environmental education project.*

Objective: *The From Seeds to Shoreline Program will provide students with the opportunity to learn about and actively participate in salt marsh restoration, including the collection, germination and cultivation and planting of **Spartina alterniflora** to areas along the SC coastline.*

Original Guinea Pigs (2010 – 2011):

Murray LaSaine Elementary	Mitchell Elementary
William Reeves Elementary	Cario Middle
Ashley Hall	Homeschool
James Island Middle School	James Island High School

Transplanting Locations:

Palmetto Islands County Park, SC DNR, Daniel Island



In The Beginning....

The Motivation:

- Search for SC salt marsh restoration project for students
- North Carolina Coastal Federation
- 2010 partnerships with Clemson and SC DNR

Partner Project

- SC Sea Grant: Grant Support, Scholastic Expertise, Curriculum
- Clemson University: Greenhouse, Curriculum, Water Quality Expertise
- SC DNR: Scientific Expertise (process protocol, ecology, restoration experience, etc), aligning with oyster reef restoration efforts (SCORE) and Coastal Discovery Program



Mother Nature's Timeline vs. The Academic School Year

1. Fall (September – October):
flowers

2. Fall (October – November):
goes to seed

*collection of seeds

3. Fall – Winter
(November – March):
dormant period

*store collected seeds in wet/
cool conditions

*plant seeds/germinate in
greenhouse

4. Spring – Summer
(March – August):
germination/growth

*transplant seedlings

1.



2.



4.



3.





Teacher Workshop Goals

- I. **Understand the importance of the salt marsh ecosystem**
- II. **Understand the purpose of the From Seeds to Shoreline Project**
- III. **Empower teachers to conduct the project**
 - professional development opportunity
 - provide “start up” materials/kits
 - ideas for supplemental activities
 - support during 2013-2014 school year
 - reflection in 2014 on project

S2S Teacher Workshops

	Teachers	Workshops	Days Per Workshop	County Representation
2012	15	1	3	12 Coastal, 3 Inland
2013	27	3	1	24 Coastal, 3 Inland



Choose Your Own Adventure (CYOA)

Step One: Collecting and Storing Seeds




Timeframe: late October/early November

Collecting *Spartina alterniflora* seeds requires a trip to the saltmarsh and a few minutes time to harvest the seeds during late October to early November. Preparing the seeds should occur as soon as possible after the seeds are collected to keep the seeds viable and to increase successful germination rates. Seeds are collected by cutting the seed head off the stalk. The seeds then need to be removed and stored in tap water in a plastic sandwich bag in the refrigerator for 6-8 weeks.

- I will collect the seeds on my own
- I will prepare the seedlings either on my own or with my class
- I need the seeds provided to me
- I need assistance with storing seeds

June 2013 – May 2014

From Seeds to Shoreline Teacher Timeline

S2S Steps	Summer	Fall	Winter	Spring	Notes
Workshop Training	<i>Attend Training; Create Plan for 2013-2014 School Year</i>	<i>Adapt CYOA; Communicate w/ Contact Person</i>			<i>Provide feedback on project when requested</i>
Educational Lessons	<i>Review and identify lessons for class</i>	<i>Implement appropriate lessons</i>			
Step 1: Seed Collection	<i>Learn process; Adapt CYOA</i>	<i>Collect Seeds</i>			
Step 2: Seed Storage	<i>Learn process; Adapt CYOA</i>	<i>Store Seeds in Moist/Cool Environment</i>		<i>Check storage is moist and cool</i>	
Step 3: Germination/ Cultivation	<i>Learn process; Adapt CYOA</i>		<i>Germinate seeds In warm, moist conditions</i>	<i>Germinate seeds In warm, moist conditions</i>	
Step 4: Restoration	<i>Learn process; Identify Spring Restoration Date</i>	<i>Schedule Spring Restoration Day with Contact Person</i>		<i>Participate in Restoration Day</i>	

Step 1: Seed Collection (October – November)



Planting of Seeds (January – February)



Germination/Cultivation (January – March)



****Acclimation (2 Weeks Prior to Transplanting)**



Restoration Day! Transplanting (April – June)



Restoration Day! Transplanting Adjacent to Oyster Reefs (April – June)



S2S Growth from 2011 to 2013

Year	Schools	Students
2011	8	600
2011-2012	12	800
2012-2013	18	1200
2013-2014	33	TBD



Take Home Messages

- Make Student Involvement Projects Repeatable for teachers and other facilitators
- Provide planning tools and suggested timelines
- Partner Communication can be tricky, establish methods beforehand
- Encourage opportunities for expansion, such as in cooperating other programs or student research on existing program





The Future

Current Goals of From Seeds to Shoreline

- I. **Continue to Refine the *Spartina alterniflora* restoration process**
 - increase success rate
 - quantify positive impact

- II. **Enhance educational context**
 - identify appropriate lessons for use
 - a) topics aligned with standards
 - b) STEM
 - c) investigation topics

- III. **Empower teachers to conduct the project**
 - professional development opportunity
 - provide “start up” materials/kits
 - support during 2013-2014 school year
 - *reflection piece in 2014 on project

Thank You!

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